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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/559,790	12/08/2005	Ui-Jung Jung	101190-00051	7531
4372	7590	11/26/2008	EXAMINER	
ARENT FOX LLP 1050 CONNECTICUT AVENUE, N.W. SUITE 400 WASHINGTON, DC 20036			SAMPLE, JONATHAN L	
			ART UNIT	PAPER NUMBER
			4184	
			NOTIFICATION DATE	DELIVERY MODE
			11/26/2008	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/559,790	<b>Applicant(s)</b> JUNG ET AL.	
	<b>Examiner</b> JONATHAN SAMPLE	<b>Art Unit</b> 4184	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 December 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____.                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/08/2005</u> .  | 6) <input type="checkbox"/> Other: ____.                          |

### **DETAILED ACTION**

Receipt is acknowledged of the IDS filed on 12/08/2005, which has been entered in the file. Claims 1-9 are pending.

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Angeles (US 6,948,576 B2) in view of Goldenberg et al (US 6,113,343).

Re claim 1. Angeles teaches a driving unit (Figure 1, driving unit 100) for a rolling vehicle, including but not limited to a wheeled robot, comprising: a drive motor (Figure 1, motor 1 and 2) to actuate a wheel (Figure 1, wheel 1 and 2), and a steering motor (Figure 1, motor 1 and 2) to control a direction of movement of the wheel (column 4, lines 4-9 and lines 50-57, column 5, lines 1-12); a steering unit comprising a differential gear unit and transmitting an actuating force generated from the steering motor to a wheel case of a wheel unit (column 6, lines 23-37); a drive unit comprising another differential gear unit and transmitting an actuating force generated from the drive motor to the wheel of the wheel unit (column 5, lines 45-59); wherein a part of the differential gear unit of the drive unit is coupled to the steering unit, so that the drive motor and the steering motor are decoupled from each other (column 5, lines 25-37 and 45-56); Angeles does not disclose a turret incorporated with the driving unit for a wheeled robot.

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Goldenberg et al teaches a mobile robot that includes a turret mechanism (Figure 6, turret mechanism 16) with the base of the robot (column 6, lines 62-66). Goldenberg et al goes on to teach a turret rotating unit (Figure 6, motor-gearhead combination 174) used to create infinite rotation of said turret (column 2, 16-20 and column 6, line 62-column 7 line 12).

In view of Goldenberg et al's teachings, it would have been obvious to one of ordinary skill in the art at the time of the invention to include a turret, with all of the corresponding components, in conjunction with the driving unit as taught by Angeles, wherein a decoupled synchro-drive mobile robot base, comprising: a turret having thereon a turret motor to actuate the turret, a drive motor to actuate a wheel, and a steering motor to control a direction of movement of the wheel; a steering unit comprising a differential gear unit and transmitting an actuating force generated from the steering motor to a wheel case of a wheel unit; a drive unit comprising another differential gear unit and transmitting an actuating force generated from the drive motor to the wheel of the wheel unit; and a turret rotating unit to transmit an actuating force generated from the turret motor to the turret, wherein a part of the differential gear unit of the drive unit is coupled to the steering unit, while a part of the differential gear unit of the steering unit is coupled to the turret rotating unit, so that the drive motor, the steering motor and the turret motor are decoupled from each other; since Goldenberg et al teaches that the use of a turret, provides an increased functionality and work efficiency of the robot to have the ability to rotate 360 degrees infinitely, it would be beneficial to incorporate the turret with all of its components, into the driving unit as taught by Angeles for increased productivity.

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Re claim 2. Angeles teaches a steering unit comprised of multiple gears (Figures 3a-4b, sun gears 9 and 10, and planet gears 11-14) coupled to multiple output shafts (Figures 1 and 2, first shaft 15 and second shaft 16) which are used to steer the driving unit (column 6, lines 23-55). Angeles fails to specifically teach a turret in the driving unit, therefore a turret connection gear is not incorporated into the steering unit as taught by Angeles.

Goldenberg et al teaches a mobile robot that includes a turret mechanism (Figure 6, turret mechanism 16). Goldenberg et al goes on to teach the components of the turret including a harmonic drive (Figure 6, harmonic drive 182) which is connected to the to the output shaft of the motor-gearhead combination (Figure 6, motor-gearhead combination 174).

In view of Goldenberg et al's teachings, it would have been obvious to one of ordinary skill in the art at the time of the invention to include a turret and all of the corresponding components, in conjunction with the driving unit as taught by Angeles, wherein, the steering unit comprises a first steering gear coupled to an output shaft of the steering motor; a second steering gear to engage with the first steering gear; a first differential gear unit coupled to a rotating shaft of the second steering gear; a third steering gear provided on a first gear box of the first differential gear unit; a turret connection gear coupled to the first differential gear unit; a fourth steering gear to engage with the third steering gear; a fifth steering gear provided on a rotating shaft of the fourth steering gear; and a sixth steering gear provided on an outer surface of the wheel case to engage with the fifth steering gear; since Goldenberg et al teaches that the use of a turret, provides an increased functionality and work efficiency of the robot to have the ability to rotate 360 degrees infinitely, it would be beneficial to incorporate the turret with all of its components, into the driving unit as taught by Angeles.

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Re claim 6. Goldenberg et al teaches a turret rotating unit (Figure 6, motor-gearhead combination 174) comprises a first turret gear provided on an output shaft of the turret motor; and a second turret gear provided on a central portion of an upper base plate (Figure 6, base section, 12) while engaging with both the first turret gear and the turret connection gear (column 6, line 62-column 7, line 7). It is inherent from the teachings as taught by Goldenberg et al, that the turret mechanism (Figure 6, turret mechanism 16) is comprised of a motor-gearhead combination (Figure 6, motor-gearhead combination 174; including multiple gears, a motor, and an output shaft, combined as one unit) which produces the ability of the turret to have infinite rotation upon the base (Figure 6, base 170) of the base section (Figure 6, base section, 12).

Re claim 3. Wherein the first differential gear unit comprises a steering input gear (Figure 3a and 3b, first planet gear 12) coupled to the rotating shaft (Figure 2, second shaft 16) of the second steering gear (Figures 2 and 3b, sun gear 10); a steering output gear (Figure 3a and 3b, second planet gear 14) supported on the first gear box by a bearing while engaging with the steering input gear (column 6, lines 32-56).

Re claim 4. Wherein the drive unit comprises a first drive gear coupled to an output shaft of the drive motor; a second drive gear to engage with the first drive gear; a second differential gear unit coupled to a rotating shaft of the second drive gear; a third drive gear provided on a second gear box of the second differential gear unit; a steering connection gear coupled to the second differential gear unit while engaging with a fourth steering gear; a fourth drive gear to engage

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with the third drive gear; a fifth drive gear provided on a rotating shaft of the fourth drive gear; and a sixth drive gear provided on an outer surface of the wheel unit to engage with the fifth drive gear. Angeles teaches the use of two planetary gear trains, positioned on either side of a planet carrier (Figures 1-4b, planet carrier 23) consisting of multiple gears (Figures 3a-4b, sun gears 9 and 10, and planet gears 11-14) that are coupled to multiple output shafts (Figures 1 and 2, first shaft 15 and second shaft 16) which are used to drive the driving unit (column 5, line 45-column 6, line 22).

Re claim 5. Wherein the second differential gear unit comprises a drive input gear (Figures 2, 3a and 4a, third planet gear 11) coupled to the rotating shaft (Figure 2, first shaft 15) of the second drive gear (Figures 2 and 4b, sun gear 9); a drive output gear (Figures 3a and 3b, fourth planet gear 13) supported on the second gear box by a bearing while engaging with the drive input gear; and a steering output gear (Figure 3a and 3b, second planet gear 14) provided on a rotating shaft (Figure 2, second shaft 16) of the steering connection gear while engaging with the drive output gear (column 5, line 59-column 6, line 22).

Re claim 7. Wherein the wheel unit (Figure 1, first wheel 21 and second wheel 22) comprises an actuating bevel gear coupled to a drive gear of the drive unit and supported by a bearing on a rotating wheel shaft having wheels on both ends thereof; an actuating differential gear unit integrally operated in conjunction with the actuating bevel gear; and the wheel case, with both the actuating bevel gear and the actuating differential gear unit provided in the wheel case, the

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rotating wheel shaft passing through the wheel case, and a steering gear of the steering unit integrated with the wheel case (column 5, lines 1-24 and column 7, lines 13-20).

Re claim 8. Wherein a gear ratio between the fifth steering gear (Figure 1, gear 5) and the sixth steering gear (Figure 1, gear 7) is equal to that of the fifth drive gear (Figure 1, gear 6) and the sixth-drive gear (Figure 1, gear 8 and column 7, lines 21-42).

Re claim 9. Wherein, on the supposition that the number of teeth of the first turret gear/the number of teeth of the turret connection gear is designated as  $n_1$ , the number of teeth of the third steering gear/the number of teeth of fourth the steering gear is designated as  $n_2$ , the number of teeth of the fourth steering gear/the number of teeth of the steering connection gear is designated as  $n_3$ , and the number of teeth of the third drive gear/the number of teeth of the fourth drive gear is designated as  $n_4$ , each gear ratio is set as  $n_1/n_2=2$ , and  $n_3/n_4=2$ , so that the drive motor, the steering motor and the turret motor are decoupled from each other; Angeles teaches in the driving unit that in a preferred embodiment of the current invention, that the gear ratios are set equal to each other, but can be modified based on the desired design of the driving unit, therefore, setting the gear ratios equal to each other for the driving unit would be at the discretion of the inventor (column 7, lines 21-42).

### ***Double Patenting***

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection



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is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

4. Claims 1-9 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 4 of U.S. Patent No. 7,328,759 B2. Although the conflicting claims are not identical, they are not patentably distinct from each other because U.S. Patent No. 7,328,759 B2 inherently claims: a mobile robot base with a turret rotatably placed on a support frame; a turret motor provided on the turret; an actuating motor unit provided on the turret to actuate a plurality of wheels; an actuating gear train unit coupled between the actuating motor unit and the plurality of wheels to transmit an actuating force generated from the actuating motor unit to a lower portion of the turret through a triple shaft mechanism; a turret gear train coupled between the turret and the turret motor, and comprising a first turret gear and a turret center gear, so that the turret motor rotates the turret on the support frame through the turret gear train; and a differential gear train unit coupled to both the turret gear train and the actuating motor unit to receive rotations of both the turret and the actuating motor unit, so that the differential gear train unit subtracts the rotation of the turret from the rotation of the actuating motor unit, thus transmitting a subtracted rotation to the plurality of wheels, and thus, only the

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rotation of the actuating motor unit is transmitted to the plurality of wheels; a drive motor to rotate the plurality of wheels; and a steering motor to control a plurality of wheel cases which hold the plurality of wheels, so that a direction of movement of the robot base is determined by an operation of the steering motor, and the actuating gear train unit comprises: a drive gear train comprising first, second and third drive gears and first and second bevel gears to transmit a rotational force generated from the drive motor to the plurality of wheels; and a steering gear train comprising first, second and third steering gears to transmit a rotational force generated from the steering motor to the plurality of wheel cases, and the differential gear train unit comprises: a first differential gear train coupled to both the turret center gear and the drive motor to receive the rotations of both the turret and the drive motor, so that the first differential gear train subtracts the rotation of the turret from the rotation of the drive motor, thus transmitting a subtracted rotation to the drive gear train; and a second differential gear train coupled to both the turret center gear and the steering motor to receive the rotations of both the turret and the steering motor, so that the second differential gear train subtracts the rotation of the turret from the rotation of the steering motor, thus transmitting a subtracted rotation to the steering gear train. The pending application also teaches a mobile robot base including all of the elements listed in the above indicated U.S. Patent.

### ***Conclusion***

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Bartsch et al (US 6,459,955 B1) teaches an autonomously movable robot with 360 degree rotation capabilities. Holmberg et al (US 6,491,127 B1) teaches a drive system base for a

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mobile robot that includes driving and steering motors. Sakamoto (US 6,477,918 B2) teaches a rotary electric machine having a coaxial output hollow shaft with a reduction gear and a slip ring.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Sample whose telephone number is (571)270-5925.

The examiner can normally be reached on M-TH 7-4:30, Alternating Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jared Fureman can be reached on 571-272-2391. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JONATHAN SAMPLE/  
Examiner, Art Unit 4184

/Isam Alsomiri/  
Primary Examiner, Art Unit 3662